SGS-CSTC Standards Technical Services Co., Ltd.
Shenzhen Branch

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SAR Evaluation Report

Application No.:	SZEM1808007678CR
Applicant:	Shanghai Suisheng Information Technology Co., Ltd
Address of Applicant:	Block 7, 518 Fuquan Bei Road, Shanghai, China
Manufacturer:	Shenzhen Eternity Technology Co., Ltd
Address of Manufacturer:	Building A2, YingZhan Industrial Park, LongTian Community, KengZi Street, Pingshan District, Shenzhen
Factory:	Shenzhen Eternity Technology Co., Ltd
Address of Factory:	Building A2, YingZhan Industrial Park, LongTian Community, KengZi Street, Pingshan District, Shenzhen
Equipment Under Test (EUT):	
EUT Name:	Tire Data Collector
Model No.:	TDC
Trade mark:	TDC
FCC ID:	2ARXD-TDC
Standards:	47 CFR Part 1.1307 47 CFR Part 2.1093 KDB447498D01 General RF Exposure Guidance v06
Date of Receipt:	2018-08-22
Date of Test:	2018-09-20 to 2018-11-29
Date of Issue:	2018-12-04
Test Result :	**PASS***

* In the configuration tested, the EUT complied with the standards specified above.

Keny Xu
EMC Laboratory Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.

2 Version

Revision Record				
Version	**Chapter**	**Date**	**Modifier**	**Remark**
01		2018-12-04		Original

Authorized for issue by:				
		Bill Chen		
		Bill Chen /Project Engineer		
		Eric Fu		
		Eric Fu /Reviewer		

3 Contents

4 General Information

4.1 General Description of EUT

Power supply:	Rechargeable battery DC 3.8V 1380mAh 5.24Wh(Charge by USB)
For RFID:	
Operation Frequency	903.24MHz to 926.76MHz
Number of Channels	50
Modulation Type	ASK
Channel Spacing	0.48MHz
Antenna Type	Ceramics
Antenna Gain	2dBi
For BLE	
Bluetooth Version:	4.2
Operation Frequency	2402MHz to 2480MHz
Number of Channels	40
Modulation Type	GFSK
Channel Spacing	2MHz
Antenna Type	PCB antenna
Antenna Gain	0dBi

4.2 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch

No. 1 Workshop, M-10, Middle section, Science & Technology Park, Shenzhen, Guangdong, China 518057

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No tests were sub-contracted.

4.3 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

• **CNAS (No. CNAS L2929)**

CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

• **A2LA (Certificate No. 3816.01)**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

• **VCCI**

The 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

• **FCC –Designation Number: CN1178**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1178. Test Firm Registration Number: 406779.

• **Innovation, Science and Economic Development Canada**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0006.

IC#: 4620C.

4.4 Deviation from Standards

None.

4.5 Abnormalities from Standard Conditions

None.

4.6 Other Information Requested by the Customer

None.

5 SAR Evaluation

5.1 RF Exposure Compliance Requirement

5.1.1 Standard Requirement

According to KDB447498D01 General RF Exposure Guidance v06

4.3.1. Standalone SAR test exclusion considerations

Unless specifically required by the published RF exposure KDB procedures, standalone 1-g head or body and 10-g extremity SAR evaluation for general population exposure conditions, by measurement or numerical simulation, is not required when the corresponding SAR Exclusion Threshold condition, listed below, is satisfied.

5.1.2 Limits

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:

[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] · [√f(GHz)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where

f(GHz) is the RF channel transmit frequency in GHz

Power and distance are rounded to the nearest mW and mm before calculation[17]

The result is rounded to one decimal place for comparison

The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion

5.1.3 EUT RF Exposure

For RFID:

The Max. power (including tune-up tolerance) is	10.86	dBm on the highest channel	0.9268	GHz (*)
10.86 dBm logarithmic terms convert to numeric result is nearly 12.19 mW				
According to the formula. calculate the test exclusion thresholds:				
$General\ RF\ Exposure = \frac{(Max.\ Power\ of\ channel, including\ tune-up\ tolerance, mW) * \sqrt{f\ (GHz)}}{(min.\ test\ separation\ distance, mm)}$				
$General\ RF\ Exposure = (12.19\ mW / 5\ mm)\ x \sqrt{0.9268\ GHz} = 2.35$			(1)	
SAR requirement:				
$S = 3.0$			(2)	
(1) < (2)				
So the SAR report is not required.				
(*) Max. power refer to Report No.:SZEM180800767802				

For BLE

The Max. power (including tune-up tolerance) is -1.31 dBm on the lowest channel 2.402 GHz (*)
-1.31 dBm logarithmic terms convert to numeric result is nearly 0.74 mW
According to the formula. calculate the test exclusion thresholds:

$$General\ RF\ Exposure = \frac{(Max.\ Power\ of\ channel, including\ tune-up\ tolerance, mW) * \sqrt{f\ (GHz)}}{(min.\ test\ separation\ distance, mm)}$$

$$General\ RF\ Exposure = (0.74\ mW / 5\ mm)\ x\ \sqrt{2.402\ GHz} = 0.23 \quad (1)$$

SAR requirement:

$$S = 3.0 \quad (2)$$

(1) < (2)
So the SAR report is not required.

(*) Max. power refer to Report No.:SZEM180800767803

When an antenna qualifies for the standalone SAR test exclusion of 4.3.1 also transmits simultaneously with other antenna,the standalone SAR value ,must be estimated according to the following to determine the simultaneous transmission SAR test exclusion criteria:

$[(max.\ power\ of\ channel,\ including\ tune\text{-}up\ tolerance,\ mW)\ /\ (min.\ test\ separation\ distance,\ mm)]\cdot[\sqrt{f_{(GHz)}}/x]$ W/kg, for *test separation distances* $\leq$ 50 mm;
where $x = 7.5$ for 1-g SAR and $x = 18.75$ for 10-g SAR.

For BLE estimated SAR value:0.0306W/kg
For RFID estimated SAR value:0.3088W/kg

exposure conditions for simultaneous transmission operations

The EUT has two modules: BLE module and RFID module, they can simultaneous transmission at the same time.

So, Simultaneous transmission SAR test is not required, because the Max. sum of the SAR value is 0.3088+0.0306=0.3394<1.6W/kg

- End of the Report -